

KEY TO THE SPECIES OF *Dasia* GRAY

- A₁. Back uniformly coloured or spotted; 26-30 scales round the body.
B₁. Supranasal in contact with each other, 26-28 scales round the body. *D. grisea* (Gray)
B₂. Supranasal not in contact with each other.
C₁. Preanals enlarged.
D. subcaerulea (Boulenger)
C₂. Preanals not enlarged.
D₁. Postanal ventral caudal scales enlarged transversely after 9th to 14th scale rows; 26 scales round the body.
D. nicobarensis n. sp.

- D₂. Ventral caudal enlarged just after the postanal scales; 28-30 scales round the body.
D. olivacea Gray
A₂. Back with broad, black, transverse bars; 24 scales round the body.
D. haliana (Halay & Nevill)

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TWO NEW SPECIES OF FROGS (RANIDAE) FROM KHASI HILLS, INDIA¹

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(With three text-figures)

During the study of the large collection of Amphibia at the Eastern Regional Station, Shillong, we came across two new species of Ranid frogs which are described here.

Rana danieli sp. nov.
(Fig. 1 and Table 1)

Two specimens of frogs collected from Mawphlang and one specimen from Nongkrem are being described as *Rana danieli* sp. nov. in honour of J. C. Daniel, Curator, Bombay Natural History Society who has made guiding contributions to the Amphibian fauna of India.

Colour: (In spirit) Dorsally varying from light brown to dark brown, sometimes with

dark irregular patches; two dorsolateral stripes from eye to hind end, the inner edge of which is whitish to grey; lateral side darker forming a dark band which is continued forwards as a preorbital stripe upto the tip of snout through the nostril. Limbs with dark cross bars, ventral side white, throat and breast sometimes mottled.

In life the specimens had a rich brown colour with a reddish tinge.

Head: Rather strongly depressed, as long as broad; snout rounded, projecting little beyond lower jaw by about diameter of tympanum; canthus rostralis obtuse; loreal region concave; nostril a little nearer to tip of snout than to eye, distance between them about one and a half times the interorbital width. Pupil elliptically horizontal, diameter of eye a little more than interorbital width; tympanum distinct, slightly depressed, smooth, about half diameter

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of eye, separated from it by a space about equal to its own diameter. Tongue moderately large, longer than broad, bifid; vomerines in oblique groups between choanae, equidistant from each other and choanae.

Forelimbs: Fairly long, about half the length from snout to vent; fingers a little swollen at tip, without intercalary bone, first longer than second, third longest, as long as snout. Subarticular tubercles prominent.



Fig. 1. *Rana danieli* sp. nov., Dorsal view.

Hindlimbs: Robust, long, $2/3$ to $3/4$ longer than length of head and body, tibiotarsal articulation reaching tip of snout or a little in front; heels overlapping when limbs are folded at right angles to the body; tibia $3\frac{1}{2}$ times as long as broad, half long as body length and about as long as forelimb or foot. Toes long,

slightly swollen with small discs at tip, fully webbed, webbing on two distal digits of fourth toe narrow but connecting tip. Outer metatarsal completely separated, subarticular tubercles prominent; inner metatarsal tubercle oval, projecting; outer tubercle not as large as inner; no tarsal fold.

Skin faintly granulated above, warts and tubercles absent, a glandular dorsolateral fold from behind eye to near vent, the maximum width between them being $1/5$ to $1/4$ th length from tip of snout to vent; another glandular fold (more prominent in the smallest specimen) from below eye to shoulder ending in a glandule. Lower parts smooth.

Skeleton: Upper jaw toothed, diapophyses cylindrical, not dilated; clavicles strong, horizontal, directed slightly forwards; omosternum with a bony style, forked at base; distal phalanx acute.

Measurements: See Table 1.

TABLE 1

BODY MEASUREMENTS IN MM OF THE THREE SPECIMENS OF *Rana danieli* sp. nov. FROM MAWPHLANG (Nos. 1 & 2) AND NONGKREM (No. 3)

	1	2	3
From snout to vent	60	40	61
Head	20	15	20
Width of head	20	15	19.5
Snout	10	8	10
Eye	7	6	7
Interorbital width	5	4	5
Tympanum	4	3	4
Forelimb	32	22	31
First finger	10	5	10
Second finger	8	4.5	7.5
Third finger	11	7.5	10
Fourth finger	8	6.5	9
Hind limb	98	72	96
Tibia	31	21	31
Foot	29	21	27
Third toe	20	14	18
Fourth toe	28	21	27
Fifth toe	20	15	19

Holotype: An adult frog, Reg. No. V/ERS. 804 in spirit, loc. Mawphlang forest (Alt. 1535 m), Khasi Hills, coll. S. Biswas, 1-xii-69. *Paratypes*: Two adult frogs, Reg. No. V/ERS. 805 in spirit, loc. Nongkrem (Alt. 1520 m), Shillong, Khasi Hills, coll. B. Datta, 20-i-1969; and Reg. No. V/ERS. 818 in spirit, loc. Mawphlang forest, Khasi Hills, coll. S. Biswas, 1-xii-1969.

Affinities: Presence of forked omosternal style, dorsolateral glandular fold continuous with the supratympanic fold and a distinct and well developed outer metatarsal tubercle constitute a combination of key characters which is found only in *Rana malabarica* Tschudi (Boulenger 1920; Daniel 1975). The outer metatarsal tubercle which is generally absent in the subgenus *Rana* is indistinct or small when present in the Asian and Australian species. *Rana malabarica* and the present species form exceptions to this. In other characters mentioned above also *R. danieli* occupies a position close to *R. malabarica*.

However, the points of differences are as tabulated below:

Rana malabarica

1. Tympanum 2/3 to once diameter of eye.
2. Forelimbs longer, about 2/3 head-body length.
3. Hindlimbs shorter, usually less than 1.5 times head-body length, rarely 1.6.
4. Tibiotarsal articulation reaching tympanum or eye only.
5. Toes 1/3 to 1/2 webbed.
6. Outer metatarsal separated only in the distal half.

Rana danieli

1. Tympanum 1/2 diameter of eye.
2. Forelimbs shorter, 1/2 head-body length.
3. Hindlimbs longer, 1.6 to 1.8 times head-body length.
4. Tibiotarsal articulation reaching tip of snout or beyond.
5. Toes almost fully webbed.
6. Outer metatarsal separated fully.

A perusal of the points of difference enumerated above, particularly with reference to hind limbs, shows that *Rana danieli* although allied to *R. malabarica* is specifically distinct from it justifying the erection of a new species. *R. malabarica* is confined to peninsular India (Western Ghats, Orissa) while *R. danieli* is an inhabitant of Khasi Hills living at elevations around 1500 metres.

***Rana mawphlangensis* sp. nov.**
(Figs. 2 & 3 and Table 2)

A single example of an adult female frog collected from Mawphlang on 13-vii-1973 is being described here as *Rana mawphlangensis* sp. nov.

Colour: (Fresh) Dorsally deep slate or bluish black with no spots, ventrally white or yellowish. Lower jaw, sides of belly and lower sides of limbs spotted or marbled with dark. Inner two toes whitish.

Head: Moderately depressed, as long as broad; snout pointed, a little longer than eye, projecting beyond lower jaw by a distance equal to tympanum; canthus rostralis obtuse; loreal region slightly concave. Nostril equidistant from eye and tip of snout; distance between nostrils more than 1½ times interorbital distance. Tympanum quite distinct, more than half diameter of eye, separated from it by about 2/3rd of its own diameter. Eyes with horizontal pupil. Vomerines in fairly oblique oval groups, behind level of choanae. Lower jaw without bony protuberences in front; tongue large, filling almost the entire buccal cavity, free and bifid behind.

Forelimbs: Fairly stout; fingers long, not webbed, without intercalary ossicles, tips swollen into small oval discs. First finger a little longer than second, third longer than snout; subarticular tubercles well developed. An elongated pad present on the inner aspect of thumb.

Hindlimbs: Long, robust; tibiotarsal articulation reaching tip of snout; heels overlapping when limbs are folded at right angles to the body; tibia 4 times as long as broad, slightly less than 2 times in length from tip of snout to vent, a little shorter than forelimb and longer than foot. Toes long, tips dilated into distinct discs not smaller than that of fingers,

Skin of anterior dorsal part smooth upto sacral region, without folds. Hind part and sides granulate and with large glands. Fold above tympanum very indistinct. Lower parts smooth.

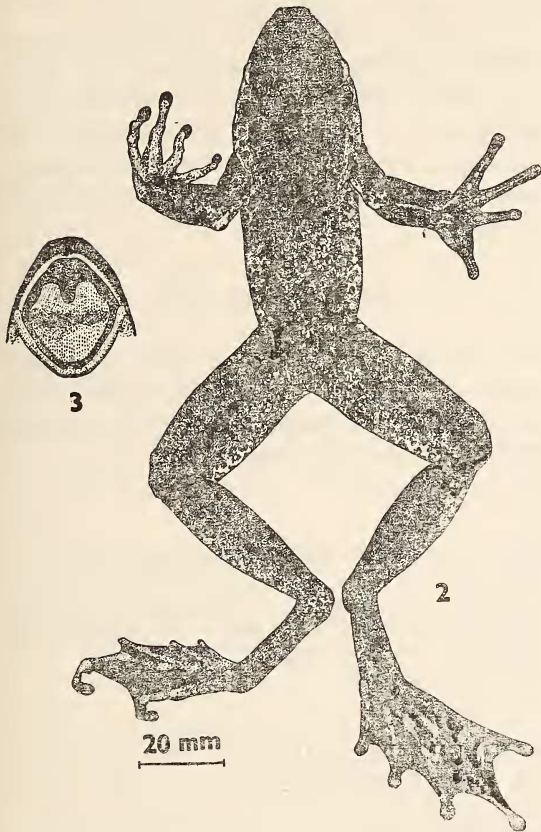
Skeleton: As in *Rana danieli* sp. nov. except that omosternum is not forked at base.

Measurements: See Table 2.

TABLE 2

BODY MEASUREMENTS IN MM OF *Rana mawphlangensis* sp. nov. FROM MAWPHLANG (HOLOTYPE)

From snout to vent	90
Head	29
Width of head	31.5
Snout	14.5
Eye	10.5
Interorbital width	6
Tympanum	6
Forelimb	56
First finger	15
Second finger	14
Third finger	18
Fourth finger	14
Hindlimb	139.5
Tibia	51
Foot	45
Third toe	30
Fourth toe	43
Fifth toe	32



Figs. 2 & 3. *Rana mawphlangensis* sp. nov.
2. Dorsal view; 3. Buccal cavity.

nearly fully webbed, last two phalanges of fourth toe free, subarticular tubercles well developed, a feeble fold on fifth toe; inner metatarsal tubercle moderately prominent; no outer tubercle.

Holotype: An adult female frog, Reg. No.V/ERS. 803 in spirit, loc. stream at Mawphlang. (Alt. 1535 m), Khasi Hills, coll. R. S. Pillai, 13-vii-1973.

The single specimen was collected from a rivulet with steep banks and overhanging vegetation. The water was clear and flowed over a gravelly bottom strewn with boulders.

Affinities: The shape of the clavicles, absence of horizontal grooves on digital discs, distinct tympanum and the separated outer metatarsals indicate that we are dealing with a member of the subgenus *Rana*.

Using the key to the species of the subgenus occurring in South Asian, Papuan, Melanesian and Australian regions by Boulenger (1920) one can place it very near to *Rana doriae* Boulenger. A comparison of characters shows that the present species is closely allied to *R. doriae* which is distributed in Tenasserim, Siam, Malay Peninsula and according to Annandale (1917) Andamans. However, there is little doubt about the specific distinctness of the two. In contrast to *R. doriae* the snout in the present species is about one and half times longer than eye and projects beyond the lower jaw. The distance between nostrils is more than $1\frac{1}{2}$ times the interorbital width which is greater than that of upper eyelid. The fold across the head behind upper eyelid that is distinct in *R. doriae* is absent in *R. mawphlangensis*. So is the case with the supratympanic fold which is hardly distinguishable in the latter. Our specimen measures almost double the head-body length of *R. doriae*, the largest of Boulenger's material being a female of

50 mm. The colour pattern of the two are also quite different. Had the differences been restricted to size and colour we would have unhesitatingly assigned the present example as a race of *doriae*. But the overall differences are sufficient to justify the erection of a new species.

Rana modesta from Celebes is allied to the present species. But the short first finger, smaller tympanum, shorter hind limbs and glandular folds distinguish it clearly from *R. mawphlangensis*. The other species which show kinship are *R. grunniens*, *R. macrodon* and *R. magna*. But in all these the first finger is much longer than second and glandular folds are present.

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REFERENCES

- ANNANDALE, N. (1917): Zoological results of a tour in the Far East. *Mem. Asiatic Soc. Bengal.* VI: 119-155.
- BOULENGER, G. A. (1920): A monograph of the South Asian, Papuan, Melanesian and Australian frogs of the genus *Rana*. *Rec. Indian Mus.* 20:1-226.
- DANIEL, J. C. (1975): Field Guide to the Amphibians of Western India, Part 3. *J. Bombay nat. Hist. Soc.* 72(2):507-522.

A NEW SPECIES OF SCORPION OF THE GENUS *SCORPIOPS* PETER (FAMILY VEJOVIDAE) FROM INDIA¹

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(With eleven text-figures)

Since Pocock's classical work on Indian Scorpions (1900) no serious attention has been given to study the scorpion fauna of this

country. Recently Mani (1959) and Basu (1964) have described few new species from the Indian sub-continent.

While examining the scorpion collection from various parts of India for the prepara-

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